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Commercial Garages

The Atlas Portland Cement Company

Members of the Portland Cement Association

30 Broad St., New York
Philadelphia

Boston

Corn Exchange Bank Bldg., Chicago
St. Louis

Minneapolis

Dayton



Pierce-Arrow Pacific Sales Co., Inc., San Francisco. Atlas-White Exterior. John Galen Howard, Architect



*Reinforced Concrete Garage of
Red Star Mill & Elevator Co.,
Wichita, Kansas, capacity 6
trucks, surfaced with Atlas-
White Portland Cement. Lehrack
Contracting & Engineering Co.,
Builders.*



The Moran Electric Garage, New York, Ernest Flagg, Architect, Turner Construction Co., Contractors

Concrete for Commercial Garages

There are two kinds of commercial garages:

1. A commercial concern's own garage for housing and repairing its own cars and trucks.
2. A public garage for housing and repairing the cars of individual owners.

Both kinds require the same type of structure for the reasons given below:

Fire-Protection

Fireproof construction for garages is required by the building laws of most cities. The presence of gasoline and other inflammable oils, the high value of the cars, and the seriousness of interruption of business through fire, make fire-protection absolutely necessary.

Fire records show that no other construction resists fire so well as concrete. Concrete buildings have come unscathed through fires which have entirely destroyed brick and steel.

Structural Considerations

The long spans required—to gain ample room inside—can be easily executed in concrete, thereby securing a rigid and substantial structure. Reinforced con-

crete can be quickly built and it offers splendid opportunity for architectural design, as shown by some of the buildings illustrated in this book.

Economy

Concrete garages are usually lower in first cost than any other fireproof or durable construction. They can be planned most economically. They deteriorate least; require almost no repairs; insurance cost is lowest. The final cost analysis shows concrete to be the most economical of all materials.

Other Advantages

Concrete is permanent—proof against wear and weather. It can be built for either very heavy or for light loads. The large window area allows for maximum light and air—and proper ventilation is a highly important safety requirement, for the air is often impregnated with volatile oils.

When you consider the ultimate cost, the importance of protection of your property and business against fire, and the adaptability of the building to its practical purposes, reinforced concrete is the logical material for your garage.

An Efficient Two-Story Garage

The drawings on page 5 illustrate and show the lay-out of a typical two-story reinforced concrete garage. This building may not have the dimensions of the space at your disposal; but it is worked out in a practical manner and is adaptable to the ordinary requirements of industrial concerns and public garages.

The plans provide the most efficient distribution of the available floor area for office, supply-store, washing space, storage of cars, repair-shop, and room for chauffeurs, with boiler-room and coal storage in the basement.

Economy of Space

Economical arrangement is of paramount importance since every possible square foot must be available for car storage. This is secured in three ways.

First—Long spans. This building is planned for moderate spans, as it is not usually practical to construct buildings over one story in height without interior columns. The obstruction these columns cause in this building has been reduced to a minimum by their location. They are far enough from the side walls to permit storing of cars behind them continuously, as indicated on opposite page. For long span construction see page 9.

Second—Column sizes are moderate—20 inches on the lower floor and 14 inches on the upper floor—and yet give strength sufficient for heavy loading.

Third—Exterior walls are thinner than in brick construction.

The combined advantages of additional light along the side wall which would ordinarily be next to another building and the saving due to the elimination of the elevator, make the scheme of an inclined entrance to the second floor a profitable investment. The space under the incline may be left open as shown in the drawing, or it may be enclosed and

used for storage of repair parts. Access may be obtained through the curtain walls of the first floor.

This building is of reinforced concrete throughout—footings, basement, columns, walls, floors, and roof. It satisfies, in every respect, the analysis of requirements for a commercial garage.

Construction details are covered on page 6 and by the drawings on page 7. Note particularly the economy obtained by the simplicity of construction.

General Layout

Basement—The floor is concrete, 5 inches thick, with a granolithic finish.

The boiler room is isolated from the rest of the building for fire protection.

Locations of tanks, heater, chimney, coal storage room and coal chutes are shown in the sketch.

Ground Floor—The front portion of the garage (for a distance of 26 feet) is partitioned off for an Auto Supply Store and an office, with sufficient space between for cars to pass into the storage room.

Alongside the front walls of the storage room are placed robe lockers and wash basins with hot and cold water connections. Electric light connections are thoroughly provided for. Placed overhead between the four central columns, is a water supply pipe with a swivel connection, allowing the hose to travel completely around the car when washing and giving convenient access to all parts. There is a drain in the center of the floor, and the floor slopes slightly toward this point.

Upper Floor—On the upper floor is a room for chauffeurs. The remaining space is divided about equally between car storage and a machine-shop.

Plenty of bench room is provided on the light side of the building where conditions of light and air are favorable for repairs.

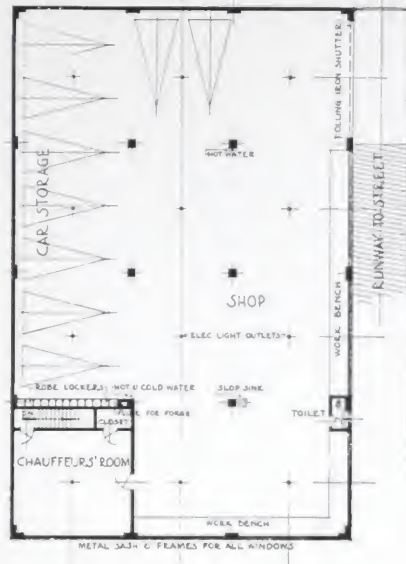
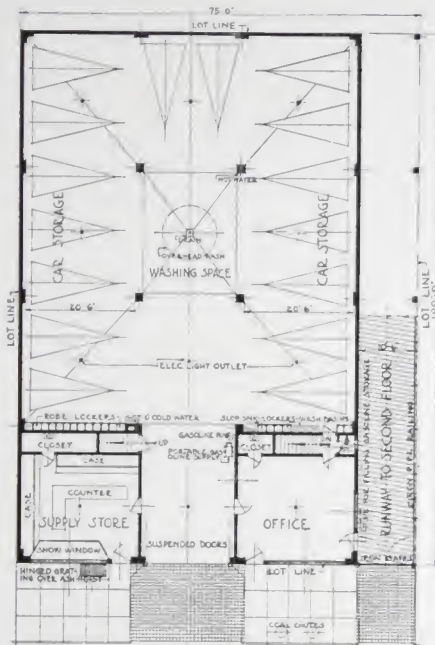
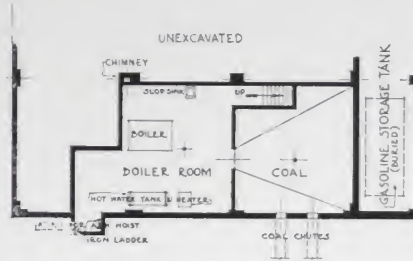
Incline—Cars enter this floor from the inclined runway through a door at the rear. This doorway is closed by a rolling iron shutter. No elevator is needed.

Reinforced Concrete Two-Story Garage

Atlas Technical Dept.

Floor plans and
perspective

(Construction details on page 7)



Construction Notes

The construction details on page 7 are typical of many concrete garages.

Foundations—These are of plain spread footing type, designed for soil pressure of three tons per square foot. Reinforcing steel runs in two directions, placed within 4" of the bottom of footings. Dowels are used to bond footings to columns and to distribute load carried by vertical reinforcement of the columns into the concrete.

Columns—These are reinforced with vertical steel only, tied together with light hoops.

Floor Construction—This is beam-and-girder design. Reinforcement (as in all the other members of building) is plain or deformed round rods. Details of the bending of slab steel, main reinforcing rods and stirrups are shown on opposite page.

The standard amount of fireproofing is provided throughout. This construction provides a monolithic frame of great rigidity and strength.

Roof Construction—The roof construction is also a part of this skeleton frame, for it is constructed as a floor. The slope of the roof is provided by a cinder fill,

upon which the usual tar and gravel covering is applied.

The Inclined Runway—The runway is constructed at the same time as the framework of the building. The pipe railing on the outside is constructed of 2½" pipe with standard fittings.

Wall Construction—Eight-inch curtain walls of concrete are used in this garage. These are as strong as 12-inch brick walls and allow greater floor space. Rolled steel windows are grouted in place in the concrete walls.

The floors are finished with a granolithic surface. This surfacing is a sand-and-cement mortar finishing coat applied directly to the floor slab. It should be troweled to a smooth surface, making a hard, abrasive, sanitary and waterproof floor that can be flushed with a hose.

The Cost Compared with Steel

In deciding how to build the garage, the question often arises "How much would a similar structure cost in steel?" We have therefore, worked out the following table, which shows comparative costs of typical bay floor construction in reinforced concrete and steel. The walls and other parts of the building are the same in both cases.

Cost Comparison of Floor Construction in Reinforced Concrete and Steel Frame Fireproofed.

The walls and other parts of the building are the same in each case.

Design:—Typical Interior Bay 25' x 64'-0" (Includes 3 Bays.)

Reinforced Concrete			Steel Frame		
Member	Size	Reinforcement	Member	Size	Reinforcement
Beam 1	8" x 20"	4—¾" rd. rods	Beam 1	15"	37½ lbs. per foot
" 2	8" x 20"	2—1½" and 2—1" " "	" 2	18"	48 " " "
" 3	12" x 28"	8—1" " "	" 3	24"	100 " " "
" 4	10" x 28"	6—¾" " "	" 4	21"	60½ " " "
" 5	12" x 28"	4—1" and 4—¾" " "	" 5	24"	85 " " "
Conc. Slab	4" thick	¾" rd. rods. 5" c-c.	Conc. Slab	4" thick	¾" rd. rods. 5" c-c.

Cost Estimate:—Labor and material, not including overhead, based on above design.

Reinforced Concrete			Steel Frame		
Concrete (1-2-4)	888 cu. ft.	@ \$0.20.....	Concrete (1-2-4)	888 cu. ft.	@ \$0.18.....
Reinforcing steel	6657 lbs.	@ .04.....	Forms 2498 sq. ft.	@ .05.....	
Forms 2488 sq. ft.	@ .10.....	248.80	Slab reinforcement 1840 lbs.	@ .04.....	73.60
			Steel I-beams 16865 lbs.	@ .04.....	674.60
Cost of Concrete Floor			Cost of Steel Floor		
\$672.68			\$1,032.44		

Construction Details

COLUMN SIZES SHOWN ON PLAN

THICKNESS

EVERY OTHER ROD BENT UP INTO TOP OF SLAB OVER BEAM ($\frac{1}{2}$ " SPACING RODS)

LAP ALL SLAB RODS 40 DIAMETERS AT SPLICES

$\frac{1}{8}$ " ϕ RODS 5" C/C

CONCRETE MIXTURE :- 1 : 2 : 4

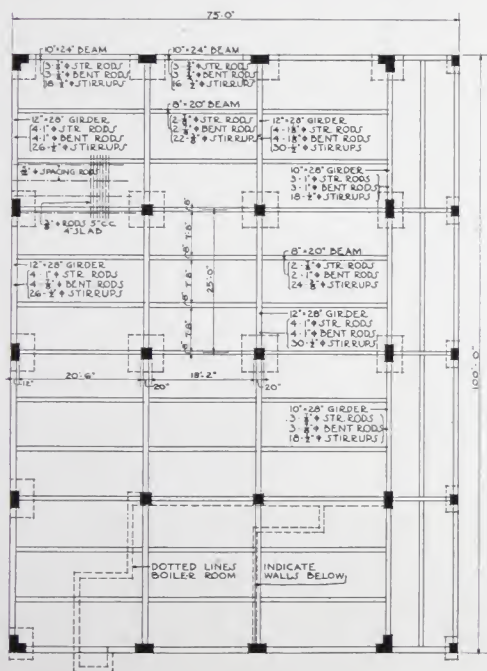


BEAM SIZES SHOWN ON PLAN

Diagram illustrating the reinforcement details for beams, showing bent rods and straight rods with specified dimensions and spacing.

- Bent Rods:** Dimensions include 40 DIAS., 15", 5", and 40 DIAS.
- Straight Rods:** Dimensions include 25 DIAMETERS, 12", 18", and 25 DIAS.
- Note:** SPACING OF STIRRUPS IN ALL BEAMS IN PROPORTION WITH THE ABOVE

ELEVATION OF BEAM

[illegible]

TRANSVERSE SECTION TAKEN THROUGH BOILER ROOM

FOUNDATION PLAN TAKEN THROUGH BOILER ROOM

One-Story Commercial Garage

Designed for a 40-foot Lot

The construction of a single-story garage of reinforced concrete is similar to that of the two-story structure just described.

The walls are of reinforced concrete, 12 inches thick. Brick walls could be used, and, in some cases, would be slightly cheaper; but brick is not so permanent, and does not offer the same fire-protection, nor the same economy of maintenance, as a building constructed entirely of concrete.

The garage, shown in the diagram on the next page, has a 40-foot clear span and is typical of economical city construction, occupying two city lots. There are no intervening columns to prevent the economical storage and handling of cars.

The two offices in front provide display for cars or auto supplies. In the rear, set off from the rest of the structure, are the boiler room and coal storage. Three skylights are provided for ample lighting. There is an overhead rotating-hose washing device.

Construction Notes

The illustrations shown on the opposite page give all members of the structure completely dimensioned. All re-

inforcement is shown. The thickness of the side walls is increased directly under the roof-beams as that portion of the wall has to act as supporting columns for the roof load.

The roof system is a simple construction built with a 4-inch slab and 10 x 36-inch reinforced concrete cross-beams spaced 10 feet apart. This is an economical design that is easily constructed and is absolutely fireproof and permanent.

The skylights are of standard manufacture and are not a source of great expense.

The floor is given a granolithic finish and troweled to a smooth dense surface.

Attractive Appearance

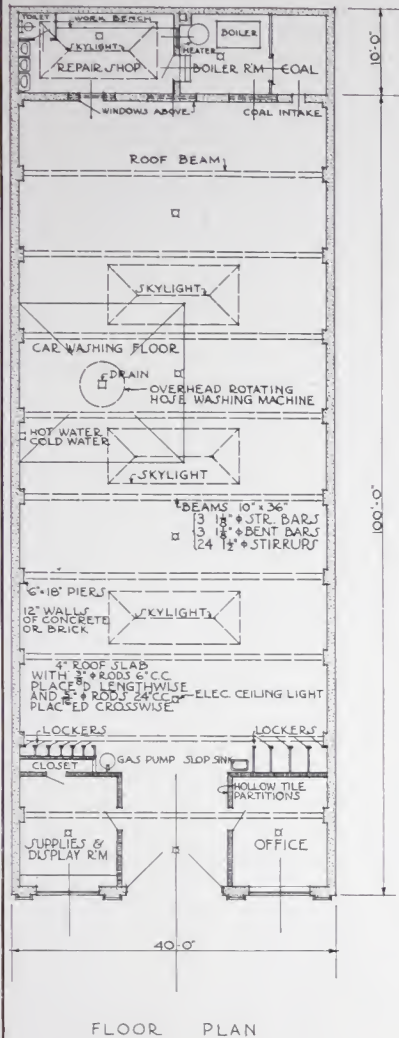
The architectural treatment of the front elevation is enhanced by incorporating panels of tapestry brick grouted in the concrete surface. The paneling of the columns is easily and cheaply accomplished by proper form construction. The entire elevation upon the removal of the forms should be given a thorough rubbing with a carborundum block to remove the form imprints and give a smooth even-textured surface.



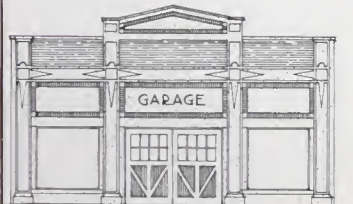
Thomson & Britton Garage, Alexandria Bay, N. Y.

Reinforced Concrete One-Story Garage

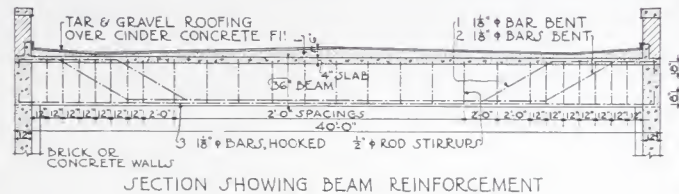
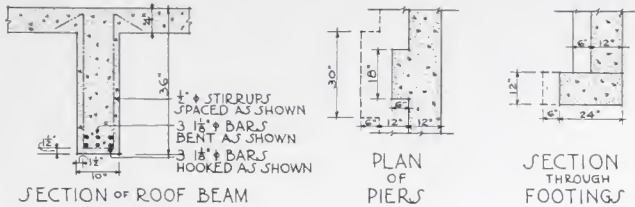
Atlas Technical Dept.



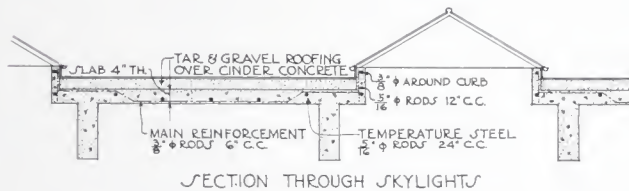
FLOOR PLAN



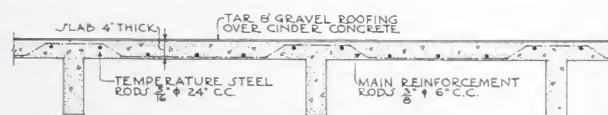
FRONT ELEVATION



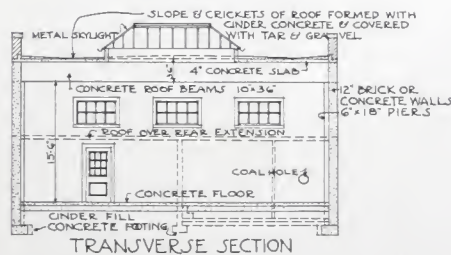
SECTION SHOWING BEAM REINFORCEMENT



SECTION THROUGH SKYLIGHTS



TYPICAL SECTION SHOWING SLAB STEEL



TRANSVERSE SECTION

Architectural Treatment

The early development of concrete was due to fire protection and economy.

Greater attention is now being given to the architectural possibilities of the material. The architectural standard reached in present-day concrete structures shows conclusively that outline, ornament, and surface treatment can all be combined in pleasing effects.

The garages illustrated show five different methods of architectural treatment, in the use of reinforced concrete.

Reinforced Concrete

The White and Ford Garages (page 11) are reinforced concrete throughout—a simple, dignified, attractive construction. Since such structures are moulded (in one operation) it is necessary merely to modify the wooden forms before pouring the concrete in order to obtain any desired wall outline. This gives wide latitude of design.

Reinforced Concrete Faced with Brick

This construction is represented by the Strawbridge & Clothier Garage and the Madison Garage (page 11), both of which are faced with brick. These buildings have the same outward appearance as steel structures; but, compared with

steel, they possess the advantages of lower cost, greater fire protection and lower maintenance.

Reinforced Concrete Faced with Stucco

A very pleasing white surface is obtained by stuccoing the concrete walls with Atlas-White, which is a pure white non-staining Portland cement of the same strength and uniformity as grey Atlas. Excellent examples of such treatment are the Red Star Garage (page 2) and the Thomson & Britton Garage (page 8).

These show two different stucco finishes. Other finishes of varying degrees of roughness are possible, ranging from the smooth trowel finish to the rough cast, spatter dash or pebble dash finish.

Atlas-White Stucco also admits of attractive coloring by addition of aggregates or mineral pigments. Cream and buffs are particularly pleasing.

Reinforced Concrete with Exterior of Atlas-White Concrete Blocks

The Pacific Sales Building of the Pierce-Arrow Company, shown on front cover, admirably illustrates this construction. The attractive outline, the distinctive ornamentation, and the pure whiteness of the Atlas-White exterior, leave little to be desired.

Concrete Block Construction

In the Buick Garage (page 11) grey rock-cut Atlas concrete blocks were used to good effect. Interior showroom walls were faced with Atlas-White Cement.

Many modifications and combinations of these five types of exterior—to meet the skill and taste of architect and owner—are possible by the use of reinforced concrete for the garage.



Stucco Garage, Ellenville, N. Y., A. B. Banks, Architect



A Group of Commercial Garages

1. Buick Auto Sales Rooms and Garage, Lincoln, Ill.
2. Public Garage, Madison, Me.
C. S. Humphries, *Engineer*
August Cary & Co., *Contractors*
3. Ford Motor Co. Garage, Cambridge, Mass.
J. J. Smith, *Architect*
Concrete Construction Co., *Contractors*
4. Strawbridge & Clothier Garage, Philadelphia
Savery, Scheetz & Savery, *Architects*
John R. Wiggins & Co., *Contractors*
5. White Motor Co. Garage, Cincinnati
Stewart & Stewart, *Architects*
Fisher & De Vore, *Contractors*
6. Forness Garage and Salesrooms, Olean, N. Y.

Further Co-operation



Should you desire further information on any of the types of garages described, we shall be glad to send you additional data and co-operate with you and your architect in securing the best building for the least money.



Illustration of a typical garage building, using Atlas Cement.